Izvestiya Mathematics 2014 vol.78 N5, pages 855-876

A geometric description of domains whose Hardy constant is equal to 1/4

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Abstract

© 2014 Russian Academy of Sciences (DoM), London Mathematical Society, Turpion Ltd. We give a geometric description of families of non-convex planar and spatial domains in which the following Hardy inequality holds: the Dirichlet integral of any smooth compactly supported function f on the domain is greater than or equal to one quarter of the integral of f2(x)/δ2(x), where δ(x) is the distance from x to the boundary of the domain. Our geometric description is based analytically on new one-dimensional Hardy-type inequalities with special weights and on new constants related to these inequalities and hypergeometric functions.

http://dx.doi.org/10.1070/IM2014v078n05ABEH002710

Keywords

Hardy inequalities, Hypergeometric functions, Non-convex domains, Torsional rigidity